

RESEARCH PROBLEM STATEMENT #DC-503

I – Problem Title

Comparison of cost/time/performance of pavement projects using performance specifications versus those using method specifications (C-02)

II – Research Problem

It is unknown whether the use by Caltrans of performance specifications would result in an improvement in pavement performance significant enough to justify the cost necessary to implement such specifications in lieu of current methods specifications. Therefore, it is desired to determine and compare the actual cost to implement performance specifications and the subsequent value of the associated increase pavement performance, before the Department devotes resources to the development of performance specifications.

III – Objective

- 1) To research literature to ascertain the extent of usage of performance specification (Performance-Related or Performance-Based as defined by AASHTO) and make recommendations. Gather initial data to compare the cost/time spent on project using performance specification versus method specifications. Develop a work plan for accomplishing this task.
- 2) Follow up research to compare the performance of pavements built using performance specification versus method specifications.
- 3) This Caltrans goal of this research is to improve RELIABILITY by improving pavement performance and thereby reducing the amount of delays caused by maintenance activities.

IV – Background

Performance specifications, which specify certain material characteristics or engineering properties related to pavement performance, are thought to be the best way to specify pavement work. However, their expected benefit is only theoretical at this time.

The American Association of Transportation Officials (AASHTO) Highway Subcommittee on Construction Quality Construction Task Force provided these definitions in its “Major Types of Transportation Construction Specifications” draft of August 2003:

- * Performance-Related Specifications (PRS)-“Specifications that use quantified Quality Characteristics and Life Cycle Cost (LCC) relationships that are correlated to product performance.”
- * Performance-Based Specifications (PBS)-“Quality Assurance Specifications that describe the desired levels of fundamental engineering properties (e.g. resilient modulus, creep properties, and fatigue) that are predictors of performance and appear in primary prediction relationships (i.e. models that can be used to predict stress, distress, or performance from combinations of predictors that represent traffic, environment, supporting materials, and structural conditions).”

Currently, the Department does not have information available to allow it to use performance specifications. Information on the use of these specifications would need to be obtained from other sources.

V – Statement of Urgency and Benefits:

The use of performance specifications should eventually improve pavement quality because testing and inspection will be focused on items related to pavement performance, rather than solely on materials properties. The use of performance specifications would not necessarily reduce, and perhaps may actually increase, the resources expended by the Department to assure pavement quality. It will take some time, probably several years, to evaluate the benefit of the use of performance specification. If action is delayed, it will take even more time to evaluate.

Since the benefit of the use of performance specifications is theoretical, it is important to ascertain what the actual benefits might be prior to implementing them.

The traveling public would benefit from the expected improvement in pavement performance.

VI –Related Research

The FHWA publication, “Performance Specifications-Strategic Road Map” dated July 2003.

The FHWA report titled “Improved Prediction Models for PCC Pavement Performance-Related Specifications”, December 2000.

VII – Deployment Potential

Performance specifications would be used on pavement projects statewide.